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ABSTRACT

National professional organizations have increasingly emphasized the need for active involvement of elementary school children in thinking, decision making, and problem solving situations. Educators are calling for role playing, writing, reading, drawing, and use of manipulatives, to name but a few activities, to become part of an integrated curriculum. In an effort to determine the needs of teachers in making the change from a more traditional methodology, this paper identifies best practices as characterized by professional organizations, and describes the characteristics of math, science, and social studies programs in eight states in the South and Southeast. A 17-item survey instrument was sent to 1000 teachers in grades 1-6, with 402 teachers responding. In line with the study objective--to identify characteristics of math, science, and social studies programs at the elementary level--the questionnaire addressed two areas: materials used for teaching and barriers to effective teaching. Tables 1, 2, and 3 present data for each of the subject areas regarding the types of materials used in the classrooms in addition to the textbook. Tables 4, 5, and 6 present data regarding areas which teachers view as being barriers to promoting an active learning environment. (Contains 13 references.) (JT)

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Status Report on Teaching in the Elementary School: Math, Science, and Social Studies

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Teaching in the elementary school often suffers from two conditions: (1) a lack of time spent on the subject and (2) passive teaching strategies which rely on textbook use. During the last eight years, national professional organizations and educators have increasingly emphasized the need for active involvement of elementary school children in thinking, decision making, and problem solving situations. This differs dramatically from traditional teaching methodology through the use of textbooks, workbooks, and handouts. Educators today are calling for role playing, writing, reading, drawing and use of manipulatives, to name but a few activities, to become part of an integrated curriculum. In an effort to determine the needs of teachers in making this change, current trends and teaching practices in elementary schools must be examined.

Educators recognize the need to prepare students for a diverse global society. However, little is known about how teachers attempt (or fail to attempt) to construct an active learning environment in their classes. In the past, students have been limited to mainly traditional textbook and workbook content delivery. While many textbook companies still promote this curriculum, educational organizations are now recommending that studies of elementary grades social studies, science, and math classes be examined more closely to determine exactly what is taking place in schools across the nation. Research will provide a better understanding of the actions and purposes of teachers within the classroom in order to gain insight into how children are engaged in learning science, social studies and math and what must be done in order for this learning to occur within the confines of meaningful situations.

Hands-on or direct experiences are considered by many educators to be essential in order for children to acquire new concepts and understandings (Butts, Hofman, Anderson, 1994). Although the term "hands-on" can be defined by educators in many different ways, the basic idea behind the approach is that students must be provided with opportunities to participate in experiences which actively engage them in problem solving, decision making, and higher order thinking skills.

Professional educators and organizations across the country continue to express concern about the conditions from which teaching suffers and advocate a need for change (Carnegie Forum on Education, 1986; National Association of State Boards of Education, 1988; National Council for the Social Studies, 1989; National Council of Teachers of Mathematics, 1989, 1991; Tilgner, 1990; National Association for the Education of Young Children, 1991; National Association of Early Childhood Specialists, 1991; National Science Foundation, 1992). This need for change implies re-education of teachers through in-service/staff development programs and advanced level courses which promote hands-on learning. NAEYC recommends "a radical shift of emphasis from a focus on content delivery to a focus on the child as a learner" (Finkelstein, 1993). Roychoudhury (1994) stated that "the need for inservice education on activity-based teaching for the practicing teacher is most urgent at the elementary level." Additionally, Shrigley (1990) addressed the positive correlation between teacher attitudes and behavior. Teachers can overcome feelings of inadequacy when involved in direct hands-on activities themselves. They are then more likely to encourage the use of hands-on activities in their classrooms.

This paper (1) identifies best practices as characterized by professional organizations and (2) describes the characteristics of math, science and social studies programs as currently presented by teachers in eight states in the South and Southeast in order to determine the extent to which elementary teachers are providing children with opportunities for active, hands-on experiences. When compared, these two aspects,

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best practice and teacher reported practice, will provide teachers, administrators, supervisors and professional educators with valuable insight regarding the needs of preservice and inservice teachers.

Subjects

A random selection of 200 elementary schools throughout the South and Southeast was contacted in order to solicit information from teachers. Of the 1000 surveys distributed, completed surveys were received from 402 teachers representing 75 schools in eight states, Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, and Tennessee. Representatives from South Carolina and Virginia did not respond.

A survey instrument was constructed for this study based on the instrument used by Finkelstein, Nielsen, and Switzer in their 1993 study on social studies instruction in the primary grades. The 17 item survey requested participants to respond to questions related to the teaching of math, science and social studies in their schools. Of primary importance were the topic of barriers to instruction in the classroom and materials used for classroom instruction.

Demographics

The majority of the respondents to the survey were women (75%). Age of respondents ranged from 21-47. The ethnic composition of the responding teachers was 82% white, 8% African American, 5% Hispanic, 4% American Indian and 1% Alaskan Native. Years of teaching experience ranged from 1-24 years. Approximately 70% of the respondents had 10 or more years of teaching experience. All of the respondents held a baccalaureate degree with approximately 45% having obtained or currently working on advanced degrees. Forty percent of the respondents reported teaching grades 1-2, 36% grades 3-4, 11% grades 5-6, and 11% Kindergarten. With the demographics indicating that the majority of the respondents work with lower elementary school children (87%), it was anticipated that material usage which encouraged active learning and hands-on participation would be used.

Results

The objective of this study was to identify characteristics of math, science, and social studies programs at the elementary level, grades 1-6. In that regard, two of the areas addressed were specific program characteristics: materials used for teaching and barriers to effective teaching.

Materials Used for Teaching

The types of materials used in elementary classrooms is basic to the creation of a class that encourages active or passive student participation. Given three lists of items (one for science one for science, and one for social studies), teachers were asked to respond to the survey item: To what extent are the following elements a part of (math, science, social studies) instruction in your classroom? The majority of the responding teachers (approximately 60%) reported using the textbook in their teaching. Tables 1, 2, and 3 present data regarding the types of materials used in the classrooms in addition to the textbook.

Mathematics

In math, counters, open-ended problems, and place value materials were generally cited as being the most frequently used materials of the respondents. Of the seven manipulatives listed, five were identified as generally being used infrequently: calculators, geometric models, fraction rods, geoboards, and tangrams. Math journals, which are currently encouraged in the literature, were seldom used as were videotapes. However, whereas journals encourage active learning, videotapes encourage passive learning.

Science

The majority of the respondents indicated seldom using approximately half of the elements listed: animal observations, field trips, guest speakers, microscopes, mystery boxes, planetariums, and population surveys. Frequent use of materials/activities which encourages active participation was reported by all states regarding the uses of learning centers, science games, and plant observations. Videos, a passive learning tool, was used by all but one set of respondents frequently and charts were used by all.

Social Studies

Maps, globes and children's books were the items most frequently used by all respondents. Of all the other elements, respondents provided a variety of responses.

Table 1: Materials of Instruction - Math

<i>Elements of Instruction</i>	AL	FL	GA	KY	LA	MS	NC	TN
Calculators reg/frequently seldom/never	34% 66%	33% 67%	25% 75%	59% 41%	25% 75%	62% 38%	65% 35%	41% 59%
Counters reg/frequently seldom/never	70% 30%	81% 19%	65% 35%	71% 29%	97% 3%	30% 70%	82% 18%	92% 8%
3-D Geometric Models reg/frequently seldom/never	41% 59%	33% 67%	34% 66%	35% 65%	46% 54%	76% 24%	36% 64%	38% 62%
Fraction Rods reg/frequently seldom/never	56% 44%	40% 60%	36% 64%	29% 71%	52% 48%	48% 52%	33% 67%	47% 52%
Geoboards reg/frequently seldom/never	52% 48%	47% 53%	18% 82%	47% 53%	30% 70%	48% 52%	54% 46%	7% 93%
Journals reg/frequently seldom/never	40% 60%	53% 47%	12% 88%	53% 47%	46% 54%	35% 65%	50% 50%	15% 85%
Open-ended Problems reg/frequently seldom/never	83% 17%	90% 10%	67% 33%	94% 6%	93% 7%	88% 12%	93% 7%	76% 24%
Place Value Materials reg/frequently seldom/never	63% 37%	75% 25%	69% 31%	82% 18%	79% 21%	73% 24%	57% 43%	77% 23%
Tangrams reg/frequently seldom/never	27% 73%	18% 82%	12% 88%	41% 59%	23% 77%	36% 64%	46% 54%	7% 93%
Videotapes reg/frequently seldom/never	25% 75%	21% 79%	16% 84%	56% 44%	4% 96%	26% 74%	6% 94%	8% 92%

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Table 2: Materials of Instruction - Science

<u>Elements of Instruction</u>	AL	FL	GA	KY	LA	MS	NC	TN
Animal Obs. reg/frequently seldom/never	55% 45%	12% 88%	47% 53%	31% 69%	33% 67%	50% 50%	33% 67%	12% 88%
Charts reg/frequently seldom/never	91% 9%	82% 18%	77% 23%	81% 19%	87% 13%	61% 39%	100% 0%	68% 32%
Field Trips reg/frequently seldom/never	59% 41%	46% 54%	31% 69%	44% 56%	26% 74%	68% 32%	43% 57%	15% 85%
Games reg/frequently seldom/never	79% 21%	56% 44%	70% 30%	63% 37%	70% 39%	79% 21%	22% 78%	48% 52%
Guest Speakers reg/frequently seldom/never	52% 48%	23% 77%	7% 93%	19% 81%	21% 79%	33% 67%	70% 30%	13% 87%
Lrning Cntrs. reg/frequently seldom/never	91% 9%	52% 48%	68% 32%	73% 25%	69% 31%	78% 22%	59% 41%	53% 47%
Magnifying Lens reg/frequently seldom/never	64% 36%	56% 44%	35% 65%	38% 62%	54% 46%	53% 47%	7% 93%	22% 78%
Microscopes reg/frequently seldom/never	26% 74%	21% 79%	7% 93%	7% 93%	20% 80%	20% 80%	59% 41%	3% 97%
Mystery Boxes reg/frequently seldom/never	18% 82%	35% 65%	16% 84%	19% 81%	24% 76%	5% 95%	25% 75%	16% 84%
Planetarium reg/frequently seldom/never	9% 91%	18% 82%	0% 100%	15% 85%	17% 83%	13% 87%	3% 97%	0% 100%
Plant/Tree Observ. reg/frequently seldom/never	59% 41%	65% 35%	59% 41%	50% 50%	51% 49%	63% 37%	58% 42%	49% 51%
Population Surveys reg/frequently seldom/never	18% 82%	12% 88%	7% 93%	27% 73%	10% 90%	6% 94%	11% 89%	11% 89%
Videos reg/frequently seldom/never	78% 22%	54% 46%	65% 35%	65% 35%	56% 44%	95% 5%	3% 93%	58% 42%

Table 3: Materials of Instruction - Social Studies

<u>Elements of Instruction</u>	AL	FL	GA	KY	LA	MS	NC	TN
Children's Books reg/frequently seldom/never	88% 14%	86% 14%	77% 23%	100% 0%	94% 6%	86% 14%	85% 15%	63% 37%
Field Trips reg/frequently seldom/never	65% 35%	37% 63%	30% 70%	44% 56%	28% 72%	61% 39%	57% 43%	26% 74%
Films/Strips reg/frequently seldom/never	50% 50%	45% 55%	49% 51%	19% 81%	21% 79%	52% 48%	28% 72%	44% 56%
Games reg/frequently seldom/never	68% 32%	59% 41%	52% 48%	48% 52%	69% 31%	73% 27%	58% 42%	49% 51%
Globes reg/frequently seldom/never	96% 4%	74% 26%	80% 20%	100% 0%	90% 10%	100% 0%	82% 18%	93% 7%
Lrng. Cntrs reg/frequently seldom/never	91% 9%	66% 34%	64% 36%	75% 25%	63% 37%	59% 41%	73% 27%	61% 39%
Maps reg/frequently seldom/never	100% 0%	75% 25%	68% 32%	100% 0%	97% 3%	100% 0%	93% 7%	65% 35%
Picture Sets reg/frequently seldom/never	78% 22%	79% 21%	74% 26%	56% 44%	63% 37%	65% 35%	75% 25%	84% 16%
Resource Books reg/frequently seldom/never	70% 30%	82% 18%	87% 13%	87% 13%	100% 0%	87% 13%	100% 0%	81% 19%
Simulations reg/frequently seldom/never	66% 34%	50% 50%	55% 45%	45% 55%	50% 50%	64% 37%	47% 53%	23% 77%
Television reg/frequently seldom/never	27% 73%	28% 72%	42% 58%	10% 90%	31% 69%	43% 57%	21% 79%	46% 54%
Videotapes reg/frequently seldom/never	45% 55%	41% 59%	67% 33%	45% 55%	44% 56%	85% 15%	59% 41%	52% 48%
Worksheets reg/frequently seldom/never	65% 35%	74% 26%	68% 32%	50% 50%	44% 56%	50% 50%	58% 42%	80% 20%

Barriers to Effective Teaching

Perceptions of teachers regarding availability of materials and support related to the various curriculum areas provide valuable insights into active versus passive learning environments established by teachers. Tables 4, 5, and 6 (following references) present data regarding areas which teachers view as being a hindrance to promoting an active learning environment.

In science, math, and social studies, four areas were identified as posing barriers to instruction: lack of appropriate instructional materials, low parental expectations, management and discipline problems, and planning and preparation requirements. Additionally, in the science and social studies areas, lack of clear curriculum guidelines was also cited as a barrier.

Table 4: Barriers to Math Instruction

Survey Item: To what extent do the following statements describe barriers to good math instruction at your level? (Mean scores) (1= Low Barrier, 5=High Barrier)

Barriers	AL	FL	GA	KY	LA	MS	NC	TN
Higher priority of other curriculum areas	1.95	1.81	1.35	1.56	2.10	1.58	1.67	1.51
Lack of administrative support	1.59	1.78	1.30	1.06	1.23	2.08	1.39	1.33
Lack of appropriate instructional materials	2.38	2.67	2.18	2.06	2.17	2.31	1.78	2.22
Lack of clear curriculum guidelines	1.33	1.93	1.45	2.00	1.50	2.00	1.67	1.55
Lack of teacher interest	1.50	1.48	1.45	1.50	1.63	1.50	1.46	1.44
Lack of teacher training	1.38	1.81	1.15	1.75	1.63	1.77	1.35	1.70
Low parental expectations	2.25	2.19	2.18	2.06	1.50	2.00	3.60	2.29
Management and discipline problems	2.00	2.78	2.36	1.81	2.27	2.85	2.96	1.74
Planning and preparation requirements	2.21	2.19	2.03	2.56	2.57	1.88	2.32	1.81

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Table 5: Barriers to Science Instruction

Survey Item: To what extent do the following statements describe barriers to good science instruction at your level? (Mean scores) (1= Low Barrier, 5=High Barrier)

Barriers	AL	FL	GA	KY	LA	MS	NC	TN
Higher priority of other curriculum areas	1.79	1.92	1.74	2.81	3.10	2.67	1.68	1.81
Lack of administrative support	1.58	1.62	1.42	1.13	1.67	2.29	1.44	1.55
Lack of appropriate instructional materials	3.00	2.59	3.13	2.94	3.00	2.81	2.56	2.74
Lack of clear curriculum guidelines	2.21	2.41	2.19	2.38	1.87	1.90	2.48	2.48
Lack of teacher interest	1.91	1.74	1.53	1.56	1.87	1.69	1.40	1.66
Lack of teacher training	1.79	1.85	1.58	2.25	2.10	2.00	1.44	1.81
Low parental expectations	2.17	2.57	2.10	1.88	1.90	2.76	2.44	2.03
Management and discipline problems	2.00	2.65	2.29	1.81	2.20	2.62	2.68	1.77
Planning and preparation requirements	2.50	2.04	2.42	2.75	3.10	2.76	3.16	2.29

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Table 6: Barriers to Social Studies Instruction

Survey Item: To what extent do the following statements describe barriers to good social studies instruction at your level? (Mean scores) (1= Low Barrier, 5=High Barrier)

Barriers	AL	FL	GA	KY	LA	MS	NC	TN
Higher priority of other curriculum areas	1.71	2.11	1.55	2.81	3.10	2.67	1.88	1.74
Lack of administrative support	1.50	1.70	1.16	1.13	1.48	2.14	1.44	1.51
Lack of appropriate instructional materials	2.71	2.61	2.65	2.94	3.06	2.32	2.52	2.77
Lack of clear curriculum guidelines	2.21	2.61	2.19	2.25	1.94	2.23	1.92	2.55
Lack of teacher interest	1.63	1.54	1.35	1.69	1.68	1.68	1.24	1.48
Lack of teacher training	1.50	1.70	1.35	2.00	1.97	1.95	1.32	1.88
Low parental expectations	2.21	2.48	2.13	1.88	1.84	2.48	2.64	2.14
Management and discipline problems	2.00	2.41	2.16	1.81	2.26	2.68	2.56	1.74
Planning and preparation requirements	2.50	2.04	2.06	2.94	3.13	1.95	2.72	2.18

Educational Implications

Research indicates that additional preparation of teachers through inservice would be one way to help solve the problem of minimal and passive teaching in the elementary classroom. In order to accomplish this, however, elementary classrooms must be analyzed to determine exactly what is occurring within the learning environment and the areas which need to be addressed through inservice training. This study lends itself easily to future replication as education reform continues. Constant change within the teaching profession will continue to sanction the need for re-examination of teaching methodology, thus affording the need for administrators and other professionals to provide staff development and inservice workshops to meet the needs and demands of practicing teachers.

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